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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/663,835   | 09/17/2003  | Fritz Gestermann     | 22133-00006-US      | 2702             |
| 30678  | 7590        | 01/12/2006           | EXAMINER            |                  |
| CONNOLLY BOVE LODGE & HUTZ LLP<br>SUITE 800<br>1990 M STREET NW<br>WASHINGTON, DC 20036-3425 |             |                      | BELL, BRUCE F       |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 1746                |                  |

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/663,835             | GESTERMANN ET AL.   |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Bruce F. Bell          | 1746                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-9, 11-17 and 19-21 is/are pending in the application.  
 4a) Of the above claim(s) 1 and 14 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_ is/are allowed.  
 6) Claim(s) 2-9, 11-13, 15-17 and 19-21 is/are rejected.  
 7) Claim(s) \_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1.) Certified copies of the priority documents have been received.  
 2.) Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3.) Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date: ____   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date: ____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: ____                                     |

## DETAILED ACTION

The examiner in charge of this application after review of applicant's changes to the non-elected claims changing the claims from process claims to product claims, has decided to exam such claims. The claims being rejoined into the examination are claims 2-9, 11, 12, 16, 17 and 19-21 along with the originally examined claims 13 and 15. The examination of the above claims is based on the final product disclosed.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2-9, 11-13, 15-17 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata et al (US 2002/0071980) in combination with Hitomi (US 2001/0041283) and Wilkinson et al (US 5795669).

Tabata et al disclose a membrane electrode assembly having a gas diffusion electrode that is made by depositing a noble metal catalyst and proton conducting ionomer in an organic solvent onto a coating of a carbon black/polytetrafluoroethylene mixture which had previously been coated onto a gas diffusion layer of a gas permeable electroconductive sheet material. See abstract. The catalyst layers are disclosed to be formed directly on the surfaces of the solid polymer electrolyte membrane by spraying or screen printing. See page 1, paragraph [009]. The gas diffusion layer/catalyst layer is prepared so that there are two or more layers, wherein at least one layer has one side

attached directly or indirectly to the gas diffusion layer and the second layer has at least one side attached directly or indirectly to the solid polymer electrolyte. Both layers have a catalyst and ionomer. See page 2, paragraph [0015]. The gas diffusion/catalyst layer maybe made by bonding the catalyst layer to the gas diffusion layer via a carbon-based particles and a fluororesin and disposed on one side of the gas diffusion layer. See page 3, paragraph [0020]. The catalyst used maybe be a noble metal catalyst or a free standing catalyst with a high surface area or a carbon supported catalyst. See page 3, paragraph [0021]. The gas diffusion layer may be a gas permeable electroconductive sheet material made of carbon fiber woven fabric, a carbon fiber nonwoven fabric, carbon felt, carbon paper, or any of these coated with a fluororesin containing carbon based particles. See page 3, paragraph [0022]. The catalyst consists of a conductor on which catalyst particles are supported. Platinum and other noble metals, as well as carbon based particles such as carbon black, activated carbon and graphite are disclosed for used in the Tabata et al invention. Particles of a noble metal of platinum or alloys of platinum and other metals are supported on carbon black particles with a specific surface area of 20 m<sup>2</sup>/g or greater. Preferably, the catalyst used, is the same catalyst, in both catalyst layers but is of a different composition in each layer. See page 4 and 5, paragraph [0040]. The catalyst content of a catalyst layer should be 0.01 to 1 mg/cm<sup>2</sup>. See page 5, paragraph [0042]. The gas diffusion layer is made of a porous sheet of carbon based particles and fluororesins such as carbon black and polytetrafluoroethylene. See page 5, paragraph [0052]. The gas diffusion layer has a coating of an ion conducting resin or a fluororesin and catalyst particles of a carbon

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based particles for forming the first catalyst layer and then forming a second catalyst layer on the first catalyst layer, where the second catalyst layer is formed of carbon based particles and a fluororesin or an ion-conducting resin. Once the coating is applied, the solvent is removed and the resin is stabilized and its adhesive power is enhanced by thoroughly heating the material to between 120 – 180 degrees centigrade. The catalyst content of the second catalyst is 0.05 to 0.5 mg/cm<sup>2</sup>. See page 6, paragraph [0055-0057].

The prior art of Tabata et al does not disclose the acetylene black/polytetrafluoroethylene combination on an electrically conductive support.

Hitomi disclose an electrode having a gas diffusion layer of a porous polymer containing an electro-conductive filler and a catalyst layer containing a particulate catalyst. See abstract. Hitomi disclose that the type of carbon particle used as the particulate catalyst material is a carbon black such as acetylene black, furnace black, graphite particle, and activated carbon. See page 3, paragraph [0064 and 0066]. The electro-conductive back bone is disclosed to be made particularly of a carbon paper, carbon cloth, carbon felt made of carbon fibers or a nonwoven fabric of carbon. The particulate catalyst may be a metal or metal alloy of the platinum group metals or a particulate carbon including carbon black, acetylene black, furnace black or activated carbon. See page 3, paragraph [0066].

Wilkinson et al disclose an electrode being produced by either applying the first and second catalytic components to a substrate wither as separate layers or as a single mixed layer and that the layers can be deposited by conventional methods such as

vacuum deposition, spray deposition, electro-deposition, casting, extrusion, rolling or printing. See col. 6, lines 20-27. The electrode of the invention is shown to have a catalyst of Pt-Ru supported on Vulcan XC72R, a high surface area carbon material. The Pt-Ru catalyst is mixed with PTFE and is deposited onto the carbon fiber substrate and the second layer of Pt-Ru is deposited onto the first layer. The platinum loading rate for both layers is also disclosed to be 0.25 and 0.35 mg/cm<sup>2</sup> respectively. See col. 7, Example 1. Example 3 shows the catalyst being mixed with PTFE and then being coated with Nafion with a loading rate of 0.36 – 0.40 mg/cm<sup>2</sup>.

The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made because even though the prior art of Tabata et al does not disclose the acetylene/polytetrafluoroethylene coating being the gas diffusion layer and the top catalyst layer, Tabata et al does show carbon black/polytetrafluoroethylene, which in the prior art of Hitomi, acetylene black is shown to be a carbon black as well as furnace black. Therefore, the use of this specific acetylene black material in the device of Tabata et al would have been obvious since acetylene black is a carbon black material and would have similar properties, including that of being a high surface area material which is desirable in gas diffusion electrodes. The prior art of Tabata et al shows the catalyst laydowns being on applicant's lower limit and include and end point and therefore, the Tabata et al patent renders the applicant's instant invention obvious. The prior art of Wilkinson et al show that the catalyst is known to be laid down on the gas diffusion layer in the amounts set forth in applicant's instant claim and that the application methods are conventional in the art. The amount of

catalyst being deposited is dependent on the manner in which the device is to be used, and would be within the ability of the person having ordinary skill in the art. The prior art of Tabata et al shows that the two catalyst layers being deposited on the gas diffusion layer may both use either PTFE or Nafion in each layer or that one layer can have the nafion and the other can have the PTFE, both of which can incorporate the catalyst material. Therefore, the prior art of Tabata et al in combination with Hitomi and Wilkinson et al render the applicant's instant invention as obvious for the reasons set forth above.

Applicants' are reminded that in a product by process, it is the product that is novel, not the process, and that if the product is found, it is applicant's responsibility to show that the process, materially changes the final product. Applicants' may file comparison data between the instant invention and that of the prior art, in affidavit form, to show that the process, does materially affect the final product, to overcome the rejection.

### ***Conclusion***

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bruce F. Bell whose telephone number is 571-272-1296. The examiner can normally be reached on Monday-Friday 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BFB  
January 9, 2005

  
Bruce F. Bell  
Primary Examiner  
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